

REMARKS

Claims 1, 2, 7, 10 and 15-23 remain pending for further prosecution in the present application. Claims 19, 20, 22 and 23 have been found to contain patentable subject matter. Applicants submit additional arguments herein in support of the patentability of claims 1, 2, 7, 10, 15-18 and 21 over the prior art of record. Accordingly, for the reasons discussed below, Applicants respectfully submit that the present application is in condition for allowance.

I. Claim Rejections - 35 USC §103(a)

In the non-final Office Action dated November 9, 2011, claims 1, 2, 7, 10 15-18 and 21 are rejected under 35 USC §103(a) as being obvious over JP 2002-208125.

Applicants respectfully submit that the microstructure of the target material required by independent claims 1 and 15 of the present application is different than that of the target materials disclosed by JP '125 and that the target according to the present invention would not have been obvious to one of ordinary skill in the art at the time the invention was made based on the disclosure of JP '125.

Independent claim 1 of the present application requires a Co-Cr-Pt-B alloy sputtering target consisting of 1 to 40at% Cr, 1 to 30at% Pt, 10 to 25at% B and a remainder of Co. The target is required to have island-shaped rolled structures (see FIG. 2 of the present application, as filed) formed from a Co-rich phase based on a primary crystal formed upon casting, Co-rich phase island structures based on an eutectic structure formed upon solidification, and B-rich phase island structures based on an eutectic structure formed upon solidification. The Co-rich phase and B-rich phase island structures based on the eutectic structure formed upon solidification are required to be located between the island-shaped structures formed from the

Co-rich phase based on the primary crystal. Further, the target is required to have a hot rolled structure formed as a result of hot rolling at a hot rolling ratio of 15 to 40%.

Independent claim 15 of the present application includes similar limitations. For instance, claim 15 requires a sputtering target for forming a magnetic film of a hard disk, consisting of a sputtering target body having a hot rolled structure and a maximum magnetic permeability of 20 or less and consisting of a Co-Cr-Pt-B alloy in which an as-cast dendrite structure of said alloy no longer exists as a result of said cast alloy being hot-rolled at a hot rolling ratio of 15 to 40%. The alloy is required to consist of 1 to 40at% Cr, 1 to 30at% Pt, 10 to 25at% B and a remainder of Co, and the sputtering target body is required to consist of island-shaped rolled structures each formed from a Co-rich phase based on a primary crystal formed upon casting, Co-rich phase island structures based on an eutectic structure formed upon solidification, and B-rich phase island structures based on an eutectic structure formed upon solidification. The island-shaped rolled structures formed from the Co-rich phase based on the primary crystal formed upon casting extend in a direction of rolling and having an average size of 200 μ m or less, and the crystals in the Co-rich phase based on the primary crystal formed upon casting have an average crystal grain size of 50 μ m or less. The Co-rich phase and B-rich phase island structures based on the eutectic structure formed upon solidification being located between the island-shaped rolled structures formed from the Co-rich phase based on said primary crystal.

Applicants respectfully submit that the fine and uniform Co-rich and B-rich phase island-shaped structures (as required by the claims of the present application) are unique to the target structure of the present application and does not exist in the target of JP '125 nor is such a structure made obvious to one of ordinary skill in the art by JP '125. The reasons for this are discussed below. Accordingly, reconsideration of the rejection based on JP '125 is respectfully requested for the reasons stated below.

JP '125 requires its target to have an average crystal grain size of the matrix of 40 μm or less. For example, see claim 6 and Paragraph Nos. 0011 and 0019 of the English language translation of JP '125 of record in the present application. In order to achieve this requirement, JP '125 discloses that the matrix must be recrystallized. For example, see Paragraph No. 0019 of JP '125 which states as follows:

“... With regard to the technique for making the average grain diameter of the matrix being 40 μm or less, it is effective to perform hot-plastic forming such as hot rolling or hot forging to recrystallize the matrix ...”

It is clear that the structure of the target disclosed by JP '125 is subject to recrystallization treatment thereby producing a recrystallized structure. Accordingly, the cast structure of the initially prepared cast ingot will not remain in the recrystallized structure due to the complete recrystallization provided by hot-working.

In contrast, with respect to the island-shaped structures in the target of the present invention, the dendrite structure in the cast structure is destroyed upon casting as a result of being rolled, not recrystallized. See page 4, lines 4-18, of the present application, as filed.

This is an important process difference which will result in the production of different microstructures. For example, claims 1 and 15 require “island-shaped rolled structures formed from a Co-rich phase based on a primary crystal formed upon casting”. With the recrystallization process of JP '125, the target of JP '125 will not have a Co-rich phase based on a primary crystal formed upon casting and will not have “island-shaped rolled structures”. Rather, JP '125 possesses an entirely recrystallized structure. For at least this reason, Applicants respectfully request reconsideration and removal of the above referenced rejection of claims 1, 2, 7, 10, 15-18 and 21 of the present application.

With respect to an additional argument for patentability of the claims of the present application, it is noted that JP '125 fails to provide any specific description (other than a

recrystallized structure discussed above) of its target. However, as evidence with respect to the structure of the target of JP '125, Applicants respectfully request the Examiner to review the disclosure provided by JP 2002-069623 A (and its English language translation) of record in the present application.

More specifically, JP '623 is directed to a Co-Cr-Pt-B based target produced by the same inventors as JP '125 (i.e., Ueno, Murata & Taniguchi of Hitachi Metals Ltd.). The target of JP '623 has the same composition as the targets described in the Examples of JP '125 and is subject to similar processing as described in JP '125. For example, Paragraph No. 0016 of JP '623 states the requirement of "recrystallizing the matrix and making the mean crystal particle size of the matrix 40 μm and under" which is virtually identical to the disclosure of JP '125. The end result is a target structure having a cell (matrix) that is divided by a network formed of boride. For example, see FIGs. 1 and 2 of JP '623.

In contrast, the structure of the target required by the claims of the present application require Co-rich phase and B-rich phase island-shaped structures based on the eutectic structure formed upon solidification to be located between the island-shaped structures formed from the Co-rich phase based on the primary crystal. See the structure illustrated in FIG. 2 of the present application and compare versus FIGs. 1 and 2 of JP '623.

Accordingly, Applicants respectfully submit that based on the above required recrystallization process of JP '125 and the evidence provided by JP '623 of what the microstructure of JP '125 would actually be, Applicants respectfully submit that the structure of the target of JP '125 would not comprise Co-rich phase and B-rich phase island-shaped structures (for instance, as shown in FIG. 2 of the present application, as filed) extending in the rolling direction (see limitation in claim 15 of the present application) as required by the present invention. In addition, the structure of JP '125 would not have a Co-rich phase island-shaped

structures based on a primary crystal formed upon casting. Accordingly, Applicants respectfully request reconsideration and removal of the above referenced rejection of claims 1, 2, 7, 10, 15-18 and 21 of the present application for at least these additional reasons.

Still further, in the Office Action dated November 9, 2011, it is stated that:

“... one of ordinary skill in the art would not see a distinctive structural difference in the hot rolled product (at 50% or any other percentage yielding a product within the guidelines disclosed by JP ‘125) and the instantly claimed hot rolled product in the case where the preferred hot rolling rate of 50% in JP ‘125 and any of the hot rolling rates of 15% to 40% in the instance claims, especially when comparing the highest rate of 40% in the instant claims with the preferred rolling rate of 50% in JP ‘125.”

Applicants respectfully disagree with the above statement and request reconsideration of this conclusion.

The specification of the present application, as filed, specifically discloses that, if the hot rolling ratio exceeds 40%, the Co-rich phase of the primary crystal and Co-rich phase that was finely dispersed in the eutectic portion will bond and become coarse, and, in parallel therewith, the B-rich phase that was finely dispersed in the eutectic area upon solidification will also bond adjacently and become coarse. For example, see page 4, line 25, to page 5, line 6, of the present application, as filed. Accordingly, it is clear that the unwanted bonding and coarsening of the Co-rich phase of the primary crystal with the Co-rich phase that was finely dispersed in the eutectic portion and bonding and coarsening of the B-rich phase will occur when a rolling ratio of 50% as required by JP ‘125 is used. Thus, Applicants submit that there is in fact a “distinctive structural difference” produced by a rolling ratio of 40% (as required by the claims of the present application) and that produced by a rolling ratio of 50% (as required by JP ‘125). The evidence for this is stated in the present application, as filed, on page 4, line 25, to page 5, line 6.

Another distinctive structural difference provided by a rolling ratio of 15% to 40% as required by the claims of the present application (i.e., claims 2 and 15) is that the size of island-

shaped rolled structures of the target required by the claims of the present application will be altered. Claims 2 and 15 of the present application require the “island-shaped rolled structures” (see FIG. 2 of the present application, as filed) to have an average size of 200 μ m or less. Also, see page 7, lines 6-10, of the present application, as filed.

The specification of the present application describes that the coarsening of the phases becomes significant if the hot rolling ratio exceeds 40% and as a result the island-shaped rolled structures of the target will have an average size of 300 to 500 μ m which is clearly beyond the scope of the claims of the present application. For example, see page 7, lines 11-23, and Table 1 and FIG. 3 of the present application, as filed.

In light of the above teachings provided by the specification of the present application, as filed, it is evident that a structure according to the present invention will become coarse when a hot rolling ratio of 50% taught by JP ‘125 is utilized. Thus, there is a distinctive structural difference provided by a rolling ratio of 40% (present invention) in comparison to a rolling ratio of 50% (JP ‘125). Support for this is provided on page 4, line 25, to page 5, line 6, and on page 7, lines 11-23, of the present application, as filed.

For all the above stated reasons, Applicants respectfully submit that claims 1, 2, 7, 10, 15-18 and 21 are patentable and non-obvious in view of JP ‘125. Applicants respectfully request reconsideration and removal of the rejection.

II. Allowable Subject Matter

Claims 19, 20, 22 and 23 have been found to recite patentable subject matter.

III. Conclusion

In view of the above remarks, Applicants respectfully submit that the claim rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Response to our deposit account no. 08-3040.

Respectfully submitted,
Howson & Howson LLP
Attorneys for Applicants

By William Bak
William Bak
Reg. No. 37,277
501 Office Center Drive
Suite 210
Fort Washington, PA 19034
(215) 540-9216